Department of Agriculture

Soil Conservation Service

Spokane, Washington

Washington Water Supply Outlook

JANUARY 1, 1988

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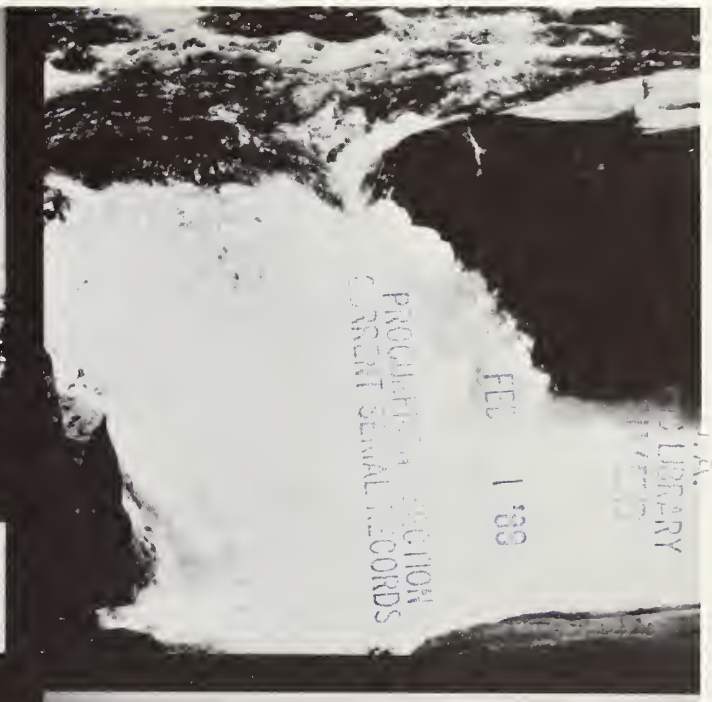

Foreword

How Forecasts Are Made

Most of the annual streamflow in the Western United States originates as snowfall. This snowfall accumulates high in the mountains during winter and early spring. As the snowpack accumulates, hydrologists estimate the runoff that will occur when it melts. Predictions are based on careful measurements of snow water equivalent at selected index points. Precipitation, temperature, soil moisture and antecedent streamflow data are viewed in conjunction with snowpack data to prepare runoff forecasts. This report presents a comprehensive picture of water supply outlook conditions for areas dependent upon surface runoff. It includes selected streamflow forecasts, summarized snowpack and precipitation data, reservoir storage data and narratives describing current conditions.

Streamflow forecasts are cooperatively generated by Soil Conservation Service and National Weather Service hydrologists. Forecasts become more accurate as more data affecting runoff becomes known. For this reason, forecasts are issued that reflect three future precipitation conditions — Below Normal, Average, and Above Normal. These forecasts are terms reasonable minimum, most probable, and reasonable maximum. Actual streamflow can be expected to fall between the lower and upper forecast values eight out of ten years.

Snowpack data are obtained by using a combination of manual and automated measurement methods. Manual readings of snow depth and water equivalent are taken at locations called snow courses on a monthly or semi-monthly schedule during the winter. In addition, snow water equivalent, precipitation, temperature, and other parameters are monitored on a daily basis and transmitted via radio telemetry to central data collection facilities. Both monthly and daily data are used to project snowmelt runoff.

For More Information

Copies of Monthly Water Supply Outlook Reports and other reports may be obtained from the states listed below. An annual snow survey data summary is published by the Soil Conservation Service for each of the western states. Historical snow survey data may be obtained at those same offices.

STATE	ADDRESS
Alaska	201 East 9th Ave., Suite 300, Anchorage, AK 99501-3687
Arizona	201 East Indianola, Suite 200, Phoenix, AZ 85012
Colorado	2490 West 26th Ave., Denver, CO 80211
New Mexico	517 Gold Ave. S.W., Room 3301, Albuquerque, NM 87102-3157
Idaho	304 North 8th Street, Room 345, Boise, ID 83702
Montana	10 East Babcock, Room 443, Federal Building, Bozeman, MT 59715
Nevada	1201 Terminal Way, Room 219, Reno, NV 89502
Oregon	1220 Southwest 3rd Ave., Room 1640, Portland, OR 97204
Utah	4402 Federal Building, 125 South State Street, Salt Lake City, UT 84147
Washington	360 U.S. Court House, Spokane, WA 99201-1080
Wyoming	Federal Building, 100 East "B" Street, Casper, WY 82601

In addition to state reports, a Water Supply Outlook for the Western United States is published by the Soil Conservation Service and National Weather Service monthly, January through May. Reports may be obtained from the Soil Conservation Service, West National Technical Center, 511 Northwest Broadway, Room 248, Portland, OR 97209.

Published by other agencies:

Water Supply Outlook Reports prepared by other agencies include: California — Snow Survey Branch, California Department of Water Resouces, P.O. Box 388, Sacramento, CA 95802; British Columbia — The Ministry of Environment, Water Investigations Branch, Parliament Buildings, Victoria, British Columbia, V8V 1X5; Yukon Territory — Department of Indian and Northern Affairs, Northern Operations Branch, 200 Range Road, Whitehorse, Yukon Territory, Y1A 3V1; Alberta, Environment Technical Services Division, 9820 106th St., Edmonton, Alberta T5K 2J6.

Washington
Water Supply Outlook

and

Federal — State — Private
Cooperative Snow Surveys

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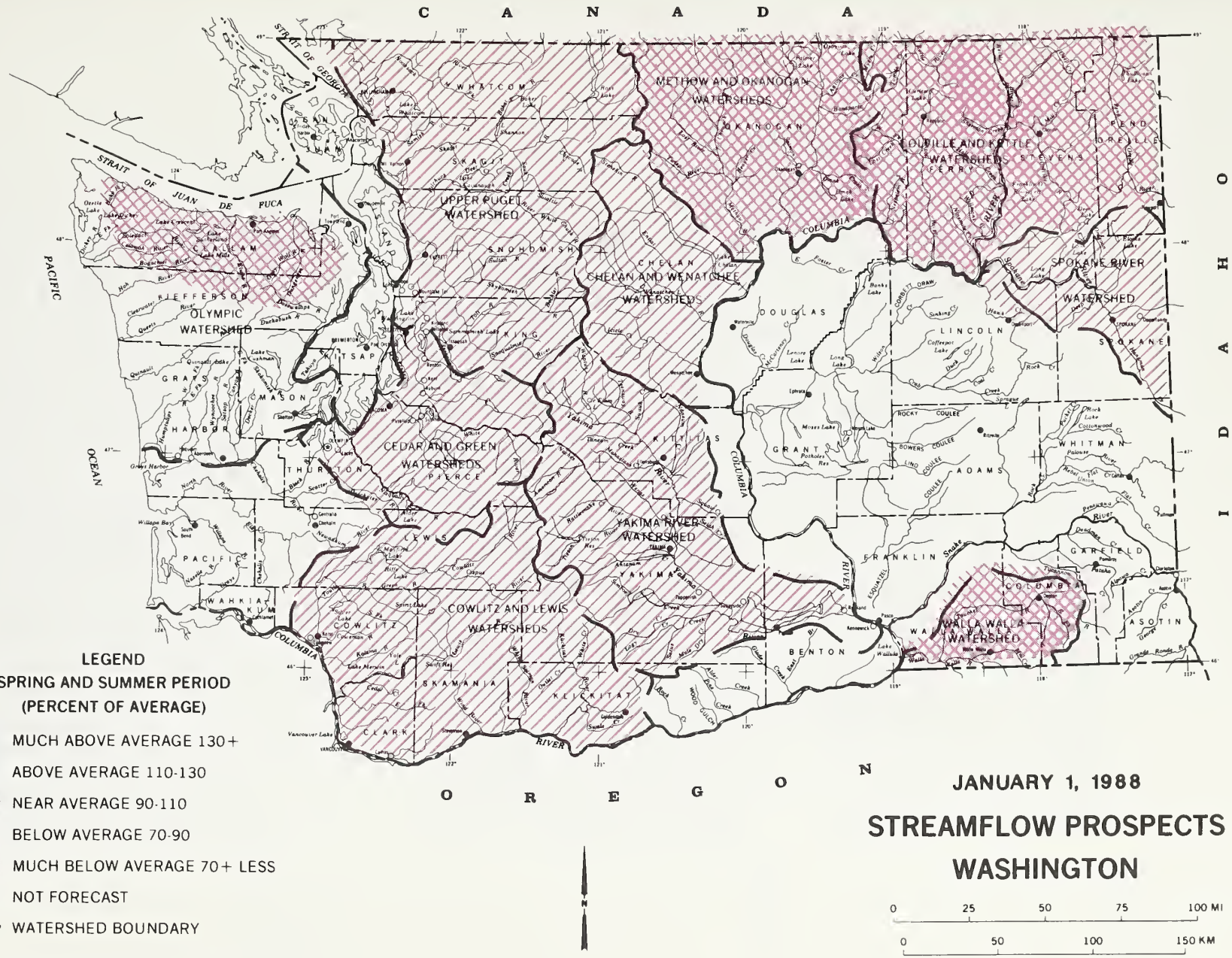
U S DEPARTMENT OF AGRICULTURE

SOIL CONSERVATION SERVICE



LEGEND
SPRING AND SUMMER PERIOD
(PERCENT OF AVERAGE)

- MUCH ABOVE AVERAGE 130+
- ABOVE AVERAGE 110-130
- NEAR AVERAGE 90-110
- BELOW AVERAGE 70-90
- MUCH BELOW AVERAGE 70+ LESS
- NOT FORECAST
- WATERSHED BOUNDARY

JANUARY 1, 1988

STREAMFLOW PROSPECTS
WASHINGTON

0 25 50 75 100 MI

0 50 100 150 KM

SOURCE: Data compiled by SCS Field Personnel.

JANUARY 1986 4-R-39641

BASE 4-R-39260

GENERAL OUTLOOK

SUMMARY:

The 1988 water year precipitation is below normal. Runoff for 1988 is forecasted to be below to much below normal in Washington. 1987 streamflow was much below normal over the entire state. The snowpack, except in the central Cascades is much below normal. Reservoir storage remains below normal at the major irrigation projects throughout the state, with the reservoirs in the Wenatchee Yakima areas much below normal. Fall and early winter streamflows were below average in Washington. NOTE: The terms "normal" and "average," as used in this publication, are the same.

SNOWPACK:

Only a few manual snow courses are read January 1, the snowpack averages are taken mainly from 37 SNOTEL sites. Most areas of Washington are below average with the Spokane Basin at 48% of normal, and the Colville - Pend Oreille River 60% of average. The eastern slopes of the Cascade Mountains have the highest average with the Wenatchee-Chelan Basin at 95%, and the Yakima Basin at 101%. On the western slopes of the Cascades the Lewis and Cowlitz basins are at 72% and the Skagit 78% and Green at 57% of normal. Maximum snowcover is at Lyman Lake SNOTEL site in the Chelan Basin, with 25.1 inches of water content. The Plains of Abraham SNOTEL will not be reporting this winter it evidently blew away!

PRECIPITATION:

December precipitation values from National Weather Service data for Washington showed the Pend Oreille Basin with 146% of normal and the Spokane with 102%. Other values include the Yakima at 120% and the White-Green Basin with 88%. December precipitation values from SNOTEL sites indicate a water year value near 64% of average for the high mountain areas of Washington. Water year to date precipitation is below average over most of the state. Values vary from 44% of normal in the Walla Walla basin to 102% in the Okanogan basin.

RESERVOIRS:

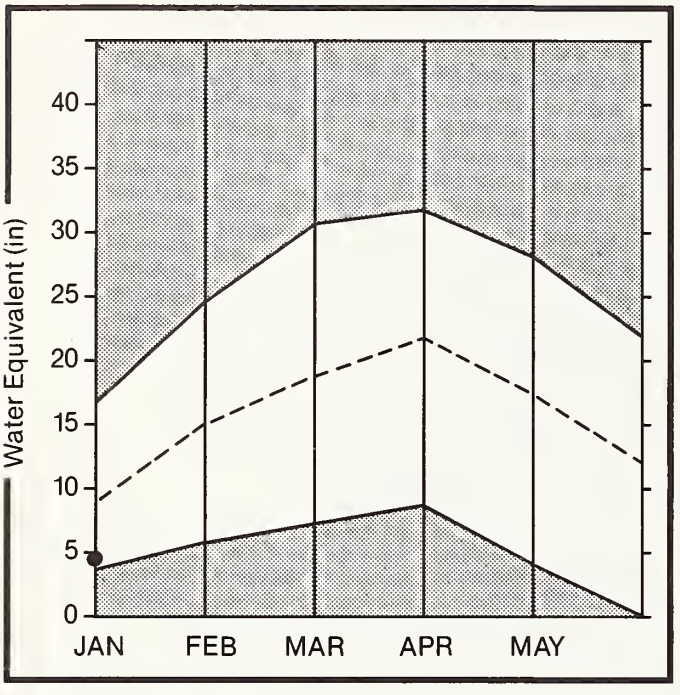
Reservoir storage in the Yakima Basin was 123,300 acre feet, 21% of average. Other major reservoir storage remains good in Washington with Roosevelt at 83% of normal. Banks Lake is at 107% and the Okanogan reservoirs at 91% of January 1 average. The power reservoirs contain the following: Coeur d' Alene Lake 110,000 acre feet or 49% of capacity, Chelan Lake 312,800 acre feet at 46% of capacity and Ross Lake at 65% of capacity.

STREAMFLOW:

January streamflow forecasts vary from 47% in the Walla Walla River to 85% in the Chelan River. December streamflows were below normal in most areas of Washington, continuing a trend established during the preceding summer. Streamflow varied from 19% on the Walla Walla River and the maximum of 74% from the Chelan River. On the west side of the Cascade Mountains, runoff from the Chehalis was 59%, the Skagit 56% and the Skykomish 60% of normal. The eastern slope of the Cascades runoff on the Yakima was 58% and the Okanogan at 55% of average. The Columbia River was 65% at the International Border and 59% at the Dalles. In Eastern Washington, the Spokane streamflow was 48% of normal and the Pend Oreille 50%.

SPOKANE

Mountain snowpack* (inches)



*Based on selected stations

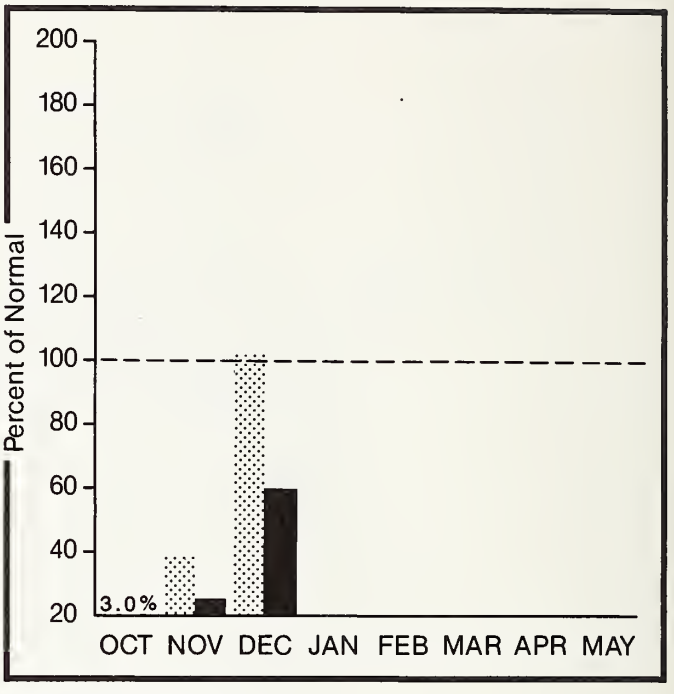
Maximum

Minimum

Average

Current

Precipitation* (percent of normal)



*Based on selected stations

Monthly precipitation

Year to date precipitation

SPOKANE RIVER BASIN

WATER SUPPLY OUTLOOK:

Forecasted runoff for the Spokane River Basin is 74% of normal. This forecast is based upon a snowpack 48% of average and a water year to date precipitation value 59% of normal. Precipitation for December was 102% of normal. Streamflow during December on the Spokane River was 48% of average at Spokane. Storage in Coeur d' Alene Lake was 110,000 acre feet compared to 134,200 last year; average storage in Cd'A for January 1 is 207,700 acre feet. Maximum snow water occurred at the Lost Lake snow course with 11 inches of water content.

For more information contact your local Soil Conservation Service office.

SPOKANE RIVER BASIN

STREAMFLOW FORECASTS

FORECAST POINT	FORECAST PERIOD	25 YR. AVG. (1000AF)	MOST PROBABLE (1000AF)	MOST PROBABLE (% AVG.)	REAS. MAX. (1000AF)	REAS. MAX. (% AVG.)	REAS. MIN. (1000AF)	REAS. MIN. (% AVG.)
SPOKANE at Post Falls	APR-SEP	2820.0	2080.0	74	3520.0	125	640.0	23
	APR-JUL	2723.0	1950.0	72	3340.0	123	560.0	21
SPOKANE at Long Lake	APR-JUL	3045.0	2192.0	72				

RESERVOIR STORAGE (1000AF)

RESERVOIR	USEABLE CAPACITY	** USEABLE STORAGE ** THIS YEAR	LAST YEAR	AVG.
COEUR D'ALENE	222.8	110.0	134.2	207.7

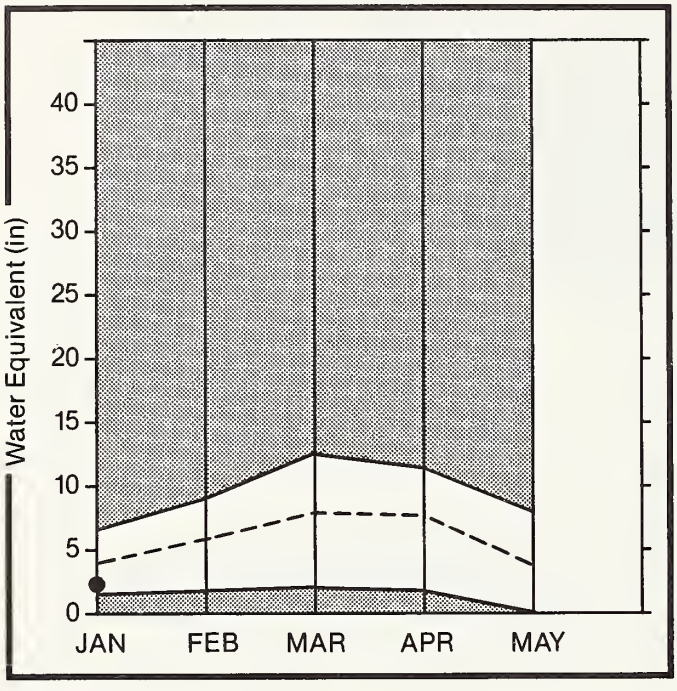
WATERSHED SNOWPACK ANALYSIS

WATERSHED	NO. COURSES AVG'D	THIS YEAR AS % OF LAST YR.	AVERAGE
Spokane River	14	60	48

1 - Reas. max. and reas. min. forecasts are for 5% and 95% exceedance levels and also (2) below.
2 - Corrected for upstream diversions or changes in reservoir storage.
The average is computed for the 1961-85 base period.

COLVILLE AND PEND OREILLE

Mountain snowpack* (inches)



*Based on selected stations

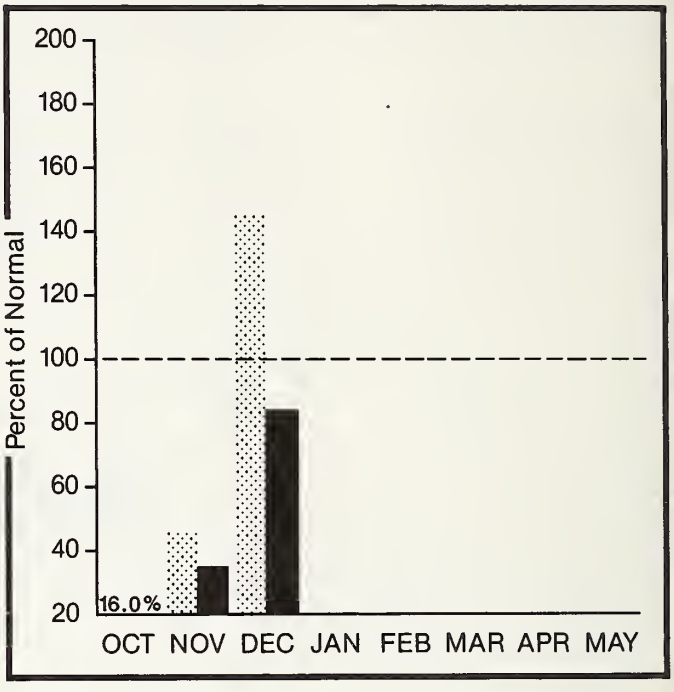
Maximum

Minimum

Average

Current

Precipitation* (percent of normal)



*Based on selected stations

Monthly precipitation

Year to date precipitation

COLVILLE - PEND OREILLE RIVER BASINS

WATER SUPPLY OUTLOOK:

Snow cover basin-wide is 60% of average. Maximum snowpack measurement for the basin was at Schweitzer Ridge with 15.7 inches of water. Precipitation during December was 146% of average, bringing the water year to date to 83% of normal. Streamflows for December were 50% of average on the Pend Oreille River, 48% on the Kettle River and 65% on the Columbia River at the International Border. The forecast for the Pend Oreille River streamflows is 77% of normal for the summer. Other forecasts are the Kettle River 60%, and the Colville River 60% of normal for the summer runoff period.

For more information contact your local Soil Conservation Service office.

COLVILLE - PEND OREILLE RIVER BASINS

STREAMFLOW FORECASTS

FORECAST POINT	FORECAST PERIOD	25 YR. AVG. (1000AF)	MOST PROBABLE (1000AF)	MOST PROBABLE (% AVG.)	REAS. MAX. (1000AF)	REAS. MAX. (% AVG.)	REAS. MIN. (1000AF)	REAS. MIN. (% AVG.)
PEND OREILLE RIVER bl Box Canyon 2	APR-SEP	15170.0	10200.0	67	15210.0	100	5190.0	34
	APR-JUL	13900.0	9350.0	67	13940.0	100	4760.0	34
	APR-JUN	11960.0	8013.0	67	11960.0	100	4065.0	34
CHAMOKANE CREEK	MAY-AUG	9.2	6.3	68				
COLVILLE RIVER at Kettle Falls	APR-SEP	139.0	83.0	60	153.0	110	14.0	10
	APR-JUL	128.0	77.0	60	141.0	110	13.0	10
	APR-JUN	118.0	71.0	60	130.0	110	12.0	10
KETTLE RIVER nr Laurier	APR-SEP	1907.0	1144.0	60	2005.0	105	285.0	15
	APR-JUL	1807.0	1120.0	62	1935.0	107	305.0	17
	APR-JUN	1622.0	1085.0	67	1815.0	112	355.0	22
COLUMBIA RIVER at Birchbank 2	APR-SEP	44390.0	37100.0	84	47310.0	107	26890.0	61
	APR-JUL	35440.0	29600.0	84	37755.0	107	21445.0	61
	APR-JUN	25650.0	21546.0	84	27450.0	107	15645.0	61
COLUMBIA RIVER at Grand Coulee 2	APR-SEP	66460.0	52800.0	79	71410.0	107	34190.0	51
	APR-JUL	55730.0	44300.0	79	59905.0	107	28700.0	51
	APR-JUN	43420.0	34310.0	79	46460.0	107	22140.0	51

RESERVOIR STORAGE (1000AF)

RESERVOIR	USEABLE CAPACITY	** USEABLE STORAGE ** THIS YEAR	LAST YEAR	AVG.
ROOSEVELT	5232.0	3762.4	4617.5	4547.9
BANKS	715.0	664.2	656.1	618.3

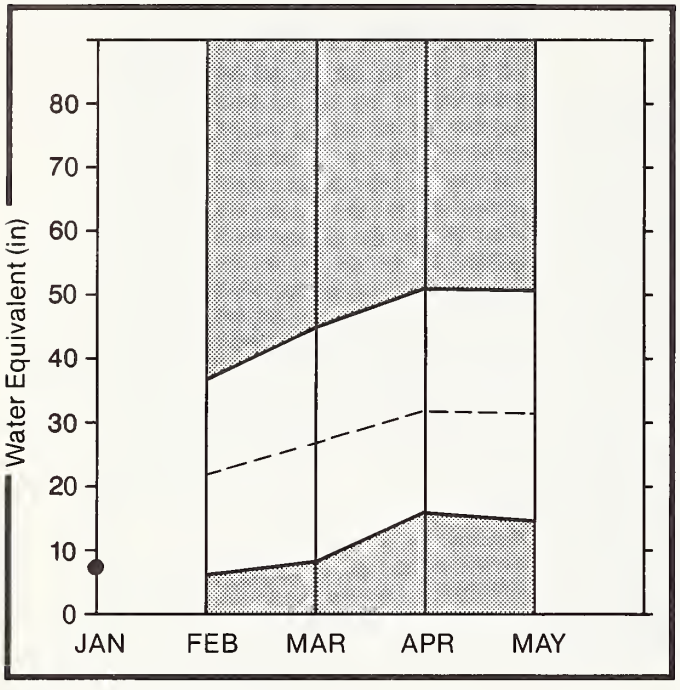
WATERSHED SNOWPACK ANALYSIS

WATERSHED	NO. COURSES AVG'D	THIS YEAR AS % OF LAST YR.	THIS YEAR AS % OF AVERAGE
Colville River	0	0	0
Pend Oreille River	9	73	60
Kettle River	2	126	69

1 - Reas. max. and reas. min. forecasts are for 5% and 95% exceedance levels and also (2) below.
2 - Corrected for upstream diversions or changes in reservoir storage.
The average is computed for the 1961-85 base period.

OKANOGAN AND METHOW

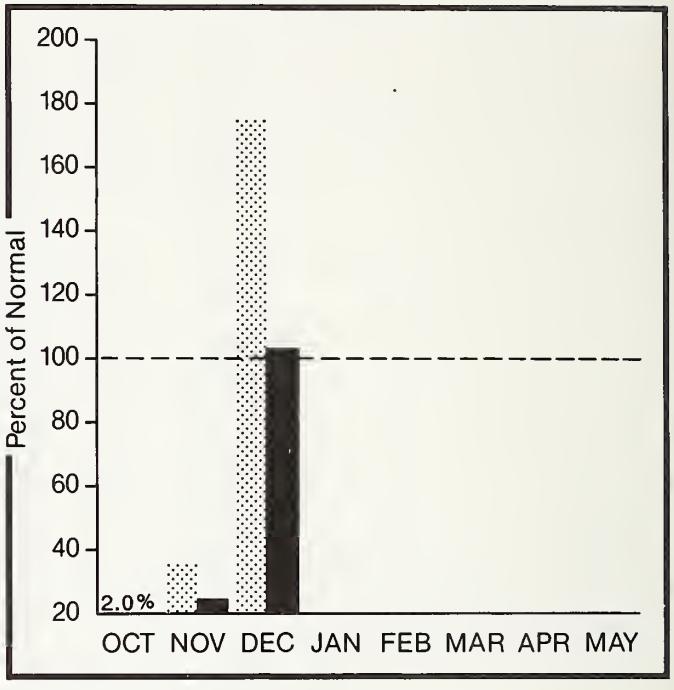
Mountain snowpack* (inches)



*Based on selected stations

Maximum
Minimum
Average
Current

Precipitation* (percent of normal)



*Based on selected stations

Monthly precipitation
Year to date precipitation

OKANOGAN - METHOW RIVER BASINS

WATER SUPPLY OUTLOOK:

Snow cover as of January 1 is 69% of average on the Okanogan-Methow Basin. Maximum snow water occurred at the Harts Pass SNOTEL, elevation 6500 feet, with 18.1 inches of water. December precipitation in the Okanogan was 173% of normal, with water year to date 102% of average. Storage in the Conconully Reservoirs is 12,400 acre feet, which is 52% of capacity and 57% of January 1 average. Summer runoff forecasted for the Okanogan River is 66% of normal. The Similkameen River 67% and the Methow River is 66% of normal. Okanogan River streamflow was at 55% of average for December, while on the Similkameen River it was 38%.

For more information contact your local Soil Conservation Service office.

OKANOGAN - METHOW RIVER BASINS

STREAMFLOW FORECASTS

FORECAST POINT	FORECAST PERIOD	25 YR. AVG. (1000AF)	MOST PROBABLE (1000AF)	MOST PROBABLE (% AVG.)	REAS. MAX. (1000AF)	REAS. MAX. (% AVG.)	REAS. MIN. (1000AF)	REAS. MIN. (% AVG.)
SIMILKAMEEN R. nr Nighthawk	APR-SEP	1432.0	959.0	67	1720.0	120	200.0	14
	APR-JUL	1333.0	893.0	67	1600.0	120	185.0	14
	APR-JUN	1128.0	756.0	67	1360.0	121	155.0	14
OKANOGAN R. nr Tonasket	APR-SEP	1661.0	1096.0	66	2060.0	124	130.0	8
	APR-JUL	1501.0	991.0	66	1865.0	124	120.0	8
	APR-JUN	1255.0	828.0	66	1560.0	124	100.0	8
METHOW RIVER nr Pateros	APR-SEP	980.0	647.0	66	1160.0	118	135.0	14
	APR-JUL	907.0	599.0	66	1075.0	119	125.0	14
	APR-JUN	769.0	508.0	66	910.0	118	105.0	14

RESERVOIR STORAGE (1000AF)

RESERVOIR	USEABLE CAPACITY	** USEABLE STORAGE ** THIS YEAR	LAST YEAR	AVG.
CONCONULLY LAKE (SALMON)	10.5	7.4	8.0	7.5
CONCONULLY RESERVOIR	13.0	4.8	5.0	5.9

WATERSHED SNOWPACK ANALYSIS

WATERSHED	NO. COURSES AVG'D	THIS YEAR AS % OF LAST YR.	AVERAGE
Okanogan River	17	99	79
Methow River	2	110	69

1 - Reas. max. and reas. min. forecasts are for 5% and 95% exceedance levels and also (2) below.
2 - Corrected for upstream diversions or changes in reservoir storage.
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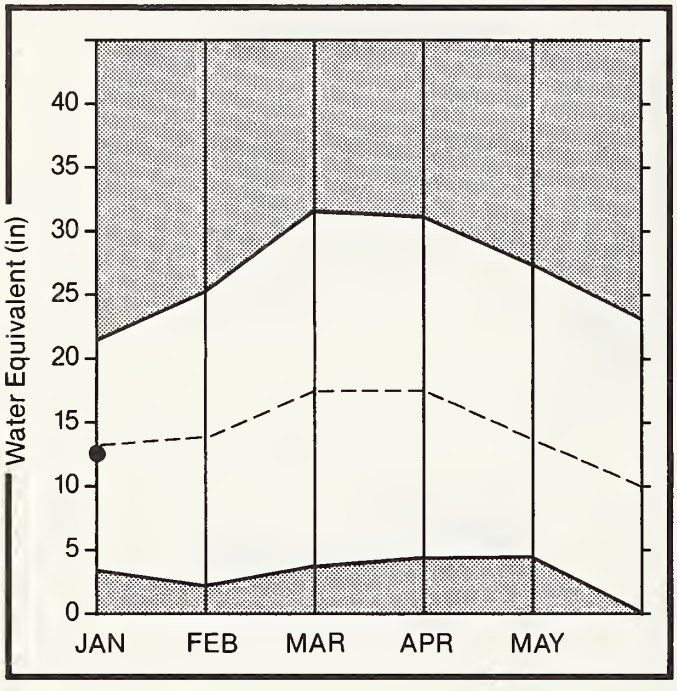
WENATCHEE AND CHELAN

Mountain snowpack* (inches)



*Based on selected stations

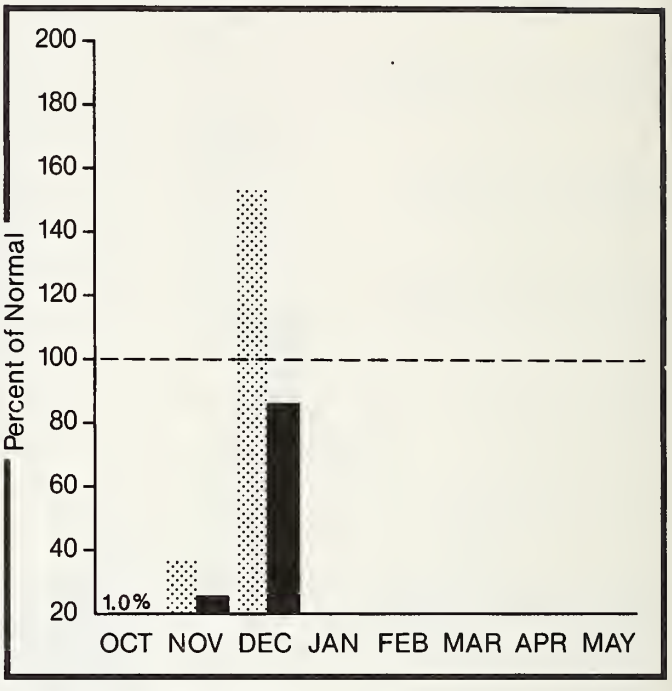
Maximum

Minimum

Average

Current

Precipitation* (percent of normal)



*Based on selected stations

Monthly precipitation

Year to date precipitation

WENATCHEE - CHELAN RIVER BASINS

WATER SUPPLY OUTLOOK:

Runoff for the Wenatchee River is forecast to be 78% of normal for the summer. Forecasts in the Chelan and Stehekin River runoff are for 81% of average. Stemilt and Icicle are forecast 80% and 77% respectively. December streamflow within the basin was 38% of normal on the Wenatchee and 74% on the Chelan River. Precipitation during December was 151% of normal in the basin and 85% from Oct. 1 to Jan. 1. Reservoir storage in Lake Chelan is 312,800 acre feet or 83% of January 1 average and 56% of capacity. Snowpack in the Wenatchee-Chelan Basin is 95% of normal. Lyman Lake SNOTEL had the most snow water with 25.1 inches on January 1.

For more information contact your local Soil Conservation Service office.

WENATCHEE - CHELAN RIVER BASINS

STREAMFLOW FORECASTS

FORECAST POINT	FORECAST PERIOD	25 YR. AVG. (1000AF)	MOST PROBABLE (1000AF)	MOST PROBABLE (% AVG.)	REAS. MAX. (1000AF)	REAS. MAX. (% AVG.)	REAS. MIN. (1000AF)	REAS. MIN. (% AVG.)
CHELAN RIVER at Chelan 1	APR-SEP	1184.0	959.0	81	1305.0	110	615.0	52
	APR-JUL	1040.0	863.0	83	1165.0	112	560.0	54
	APR-JUN	815.0	693.0	85	930.0	114	455.0	56
STEHEKIN R. at Stehekin	APR-SEP	844.0	675.0	80	890.0	105	460.0	55
	APR-JUL	714.0	593.0	83	775.0	109	415.0	58
	APR-JUN	541.0	465.0	86	600.0	111	330.0	61
ENTIAT RIVER nr Ardenvoir	APR-SEP	233.0	184.0	79	255.0	109	110.0	47
	APR-JUL	221.0	181.0	82	250.0	113	115.0	52
	APR-JUN	171.0	145.0	85	200.0	117	90.0	53
WENATCHEE RIVER at Plain	APR-SEP	1270.0	991.0	78	1450.0	114	530.0	42
	APR-JUL	1113.0	879.0	79	1280.0	115	475.0	43
	APR-JUN	899.0	719.0	80	1045.0	116	395.0	44
STEMILT nr Wenatchee (miners in)	MAY-SEP	138.0	110.0	80	160.0	116	60.0	43
ICICLE CREEK nr Leavenworth	APR-SEP	370.0	285.0	77	420.0	114	150.0	41
	APR-JUL	340.0	270.0	79	395.0	116	145.0	43
	APR-JUN	270.0	220.0	81	320.0	119	120.0	44
COLUMBIA R. bl Rock Island Dam 2	APR-SEP	72250.0	57800.0	80	78050.0	108	37550.0	52
	APR-JUL	61050.0	48800.0	80	65900.0	108	31700.0	52
	APR-JUN	47730.0	38185.0	80	51550.0	108	24820.0	52

RESERVOIR STORAGE (1000AF)

RESERVOIR	USEABLE CAPACITY	** USEABLE STORAGE ** THIS YEAR	LAST YEAR	AVG.
CHELAN LAKE	676.1	312.8	365.0	378.7

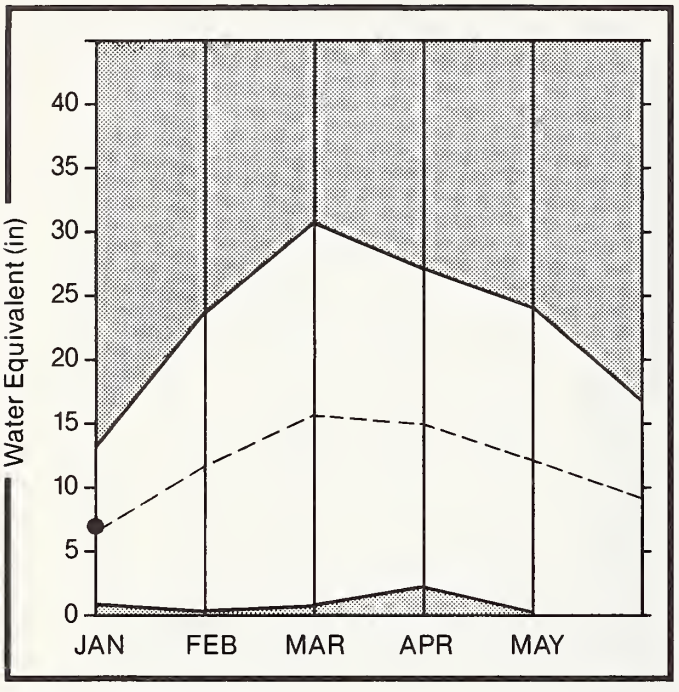
WATERSHED SNOWPACK ANALYSIS

WATERSHED	NO. COURSES AVG'D	THIS YEAR AS % OF LAST YR.	AVERAGE
Chelan Lake Basin	3	96	105
Entiat River	0	0	0
Wenatchee River	7	107	89
Colockum Creek	1	166	114
Squilchuck Creek	0	0	0
Stemilt Creek	0	0	0

1 - Reas. max. and reas. min. forecasts are for 5% and 95% exceedance levels and also (2) below.
2 - Corrected for upstream diversions or changes in reservoir storage.
The average is computed for the 1961-85 base period.

YAKIMA

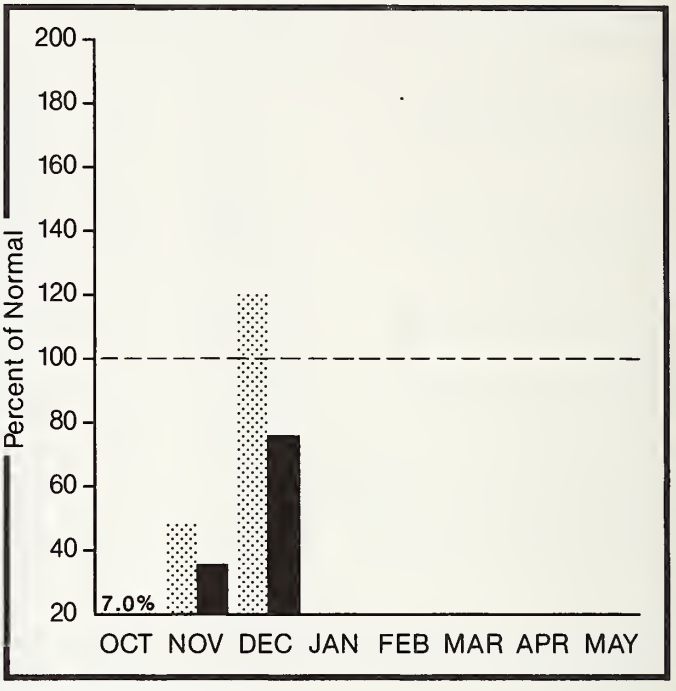
Mountain snowpack* (inches)



*Based on selected stations

Maximum
Minimum
Average
Current

Precipitation* (percent of normal)



*Based on selected stations

Monthly precipitation
Year to date precipitation

YAKIMA RIVER BASIN

WATER SUPPLY OUTLOOK:

December reservoir storage for the five major reservoirs was at 127,700 acre feet or 21% of normal. Reservoir storage is the lowest since 1933. December streamflow for the Yakima Basin was 58% of normal. Forecasts for the Yakima Basin runoff vary throughout the basin as follows: the Yakima River at Cle Elum 75%, Naches River 76%, the Yakima River at Parker 70% and Ahtanum Creek 77%. Snowpack is 99% of average in the Yakima Basin based upon 11 snow course and SNOTEL readings. December precipitation was 120% of normal and 75% for the water year to date.

For more information contact your local Soil Conservation Service office.

YAKIMA RIVER BASIN

STREAMFLOW FORECASTS

FORECAST POINT	FORECAST PERIOD	25 YR. AVG. (1000AF)	MOST PROBABLE (1000AF)	MOST PROBABLE (% AVG.)	REAS. MAX. (1000AF)	REAS. MAX. (% AVG.)	REAS. MIN. (1000AF)	REAS. MIN. (% AVG.)
YAKIMA RIVER at Martin 1	APR-SEP	136.0	110.0	81	135.0	99	85.0	63
	APR-JUL	126.0	102.0	81	125.0	99	80.0	63
	APR-JUN	112.0	91.0	81	110.0	98	70.0	63
YAKIMA RIVER at Cle Elum 2	APR-SEP	951.0	710.0	75	865.0	91	555.0	58
	APR-JUL	846.0	630.0	74	765.0	90	495.0	59
	APR-JUN	735.0	560.0	76	680.0	93	440.0	60
YAKIMA RIVER nr Parker 2	APR-SEP	2075.0	1450.0	70	2075.0	100	825.0	40
	APR-JUL	1862.0	1300.0	70	1860.0	100	740.0	40
	APR-JUN	1643.0	1150.0	70	1645.0	100	655.0	40
KACHESS RIVER nr Easton 1	APR-SEP	133.0	90.0	68	115.0	86	65.0	49
	APR-JUL	114.0	77.0	68	100.0	88	55.0	48
	APR-JUN	102.0	69.0	68	90.0	88	50.0	49
CLE ELUM RIVER nr Roslyn 1	APR-SEP	459.0	350.0	76	430.0	94	270.0	59
	APR-JUL	417.0	315.0	76	390.0	94	240.0	58
	APR-JUN	353.0	268.0	76	330.0	93	205.0	58
BUMPING RIVER nr Nile 1	APR-SEP	139.0	120.0	86	165.0	119	75.0	54
	APR-JUL	128.0	110.0	86	150.0	117	70.0	55
	APR-JUN	106.0	91.0	86	125.0	118	55.0	52
AMERICAN RIVER nr Nile	APR-SEP	121.0	92.0	76	130.0	107	55.0	45
	APR-JUL	112.0	89.0	79	125.0	112	55.0	49
	APR-JUN	94.0	77.0	82	105.0	112	50.0	53
TIETON RIVER at Tieton 1	APR-SEP	244.0	183.0	75	260.0	107	110.0	45
	APR-JUL	208.0	156.0	75	220.0	106	90.0	43
	APR-JUN	168.0	126.0	75	180.0	107	75.0	45
NACHES RIVER nr Naches 2	APR-SEP	860.0	650.0	76	925.0	108	375.0	44
	APR-JUL	779.0	590.0	76	840.0	108	340.0	44
	APR-JUN	667.0	507.0	76	720.0	108	290.0	43
AHTANUM CREEK nr Tampico 2	APR-SEP	47.0	36.0	77	60.0	128	15.0	32
	APR-JUL	43.0	33.0	77	55.0	128	10.0	23
	APR-JUN	37.0	28.0	76	45.0	122	10.0	27

RESERVOIR STORAGE (1000AF)

RESERVOIR	USEABLE CAPACITY	** USEABLE STORAGE ** THIS YEAR	LAST YEAR	AVG.
KEECHELUS	157.8	23.2	64.2	83.0
KACHESS	239.0	31.5	55.5	159.1
CLE ELUM	436.9	24.7	102.2	230.2
BUMPING LAKE	33.7	7.1	12.4	6.3
RIMROCK	198.0	36.8	103.6	102.1

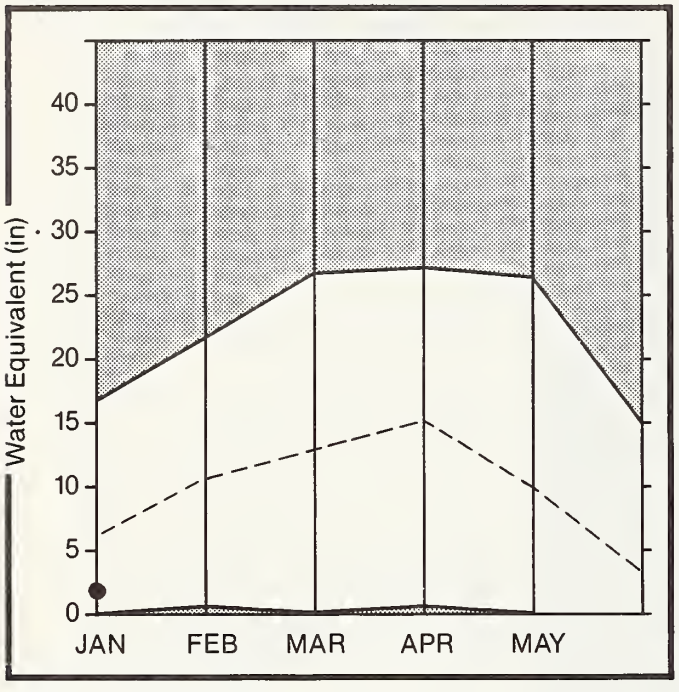
WATERSHED SNOWPACK ANALYSIS

WATERSHED	NO. COURSES AVG'D	THIS YEAR AS % OF LAST YR.	AVERAGE
Yakima River	11	121	99
Ahtanum Creek	2	199	123

1 - Reas. max. and reas. min. forecasts are for 5% and 95% exceedance levels and also (2) below.
2 - Corrected for upstream diversions or changes in reservoir storage.
The average is computed for the 1961-85 base period.

WALLA WALLA

Mountain snowpack* (inches)



*Based on selected stations

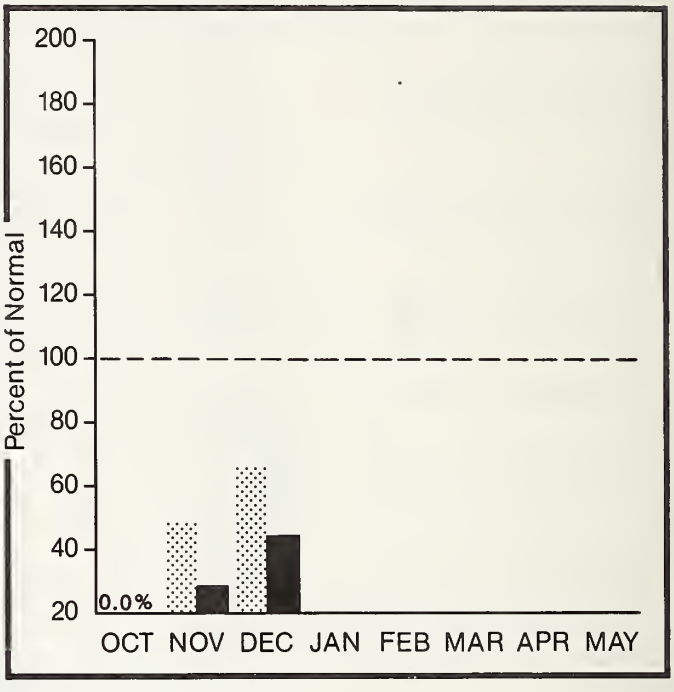
Maximum

Minimum

Average

Current

Precipitation* (percent of normal)



*Based on selected stations

Monthly precipitation

Year to date precipitation

WALLA WALLA RIVER BASIN

WATER SUPPLY OUTLOOK:

The forecast call for 47% of average streamflow in the Walla Walla River for the coming summer. Streamflow for the Snake River is at 63% of normal for December and 19% on the Walla Walla River. December precipitation was 66% of average and the water year to date precipitation has been 44% of normal. Snowpack in the Walla Walla River Basin is 30% of normal. Water content at the Touchet SNOTEL site was 7.3 inches on January 1.

For more information contact your local Soil Conservation Service office.

WALLA WALLA RIVER BASIN

STREAMFLOW FORECASTS

FORECAST POINT	FORECAST PERIOD	25 YR. AVG. (1000AF)	MOST PROBABLE (1000AF)	MOST PROBABLE (% AVG.)	REAS. MAX. (1000AF)	REAS. MAX. (% AVG.)	REAS. MIN. (1000AF)	REAS. MIN. (% AVG.)
MILL CREEK at Walla Walla	APR-SEP	17.5	10.9	62	20.0	114	5.0	29
	APR-JUL	17.3	10.6	61	20.0	115	5.0	29
	APR-JUN	17.2	10.7	62	20.0	117	5.0	29
SF WALLA WALLA nr MiltonFreewater	APR-JUL	55.0	30.0	55	45.0	82	15.0	27
COUSE CK nr Milton Freewater	APR-JUL	3.6	1.7	47	4.0	111	1.0	28
PINE CREEK nr Weston	APR-JUL	2.7	1.2	45	3.0	111	1.0	37
COLUMBIA R. at The Dalles 2	APR-SEP	101800.0	74600.0	73	104130.0	102	45070.0	44
	APR-JUL	87110.0	63800.0	73	89070.0	102	38525.0	44
	APR-JUN	70470.0	51443.0	73	71900.0	102	31000.0	44

RESERVOIR STORAGE (1000AF)

RESERVOIR	USEABLE CAPACITY	** USEABLE STORAGE ** THIS YEAR	LAST YEAR	AVG.

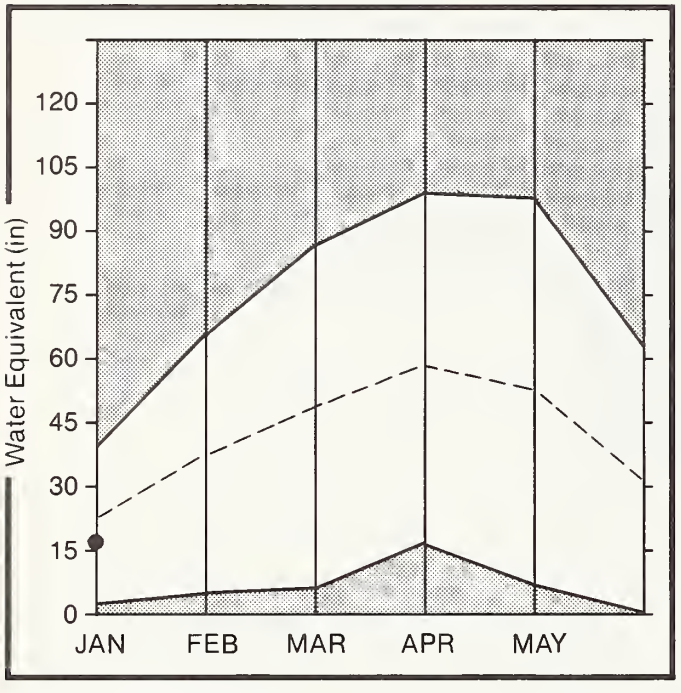
WATERSHED SNOWPACK ANALYSIS

WATERSHED	NO. COURSES AVG'D	THIS YEAR AS % OF LAST YR.	THIS YEAR AS % OF AVERAGE
Mill Creek	1	36	30

1 - Reas. max. and reas. min. forecasts are for 5% and 95% exceedance levels and also (2) below.
2 - Corrected for upstream diversions or changes in reservoir storage.
The average is computed for the 1961-85 base period.

COWLITZ AND LEWIS

Mountain snowpack* (inches)



*Based on selected stations

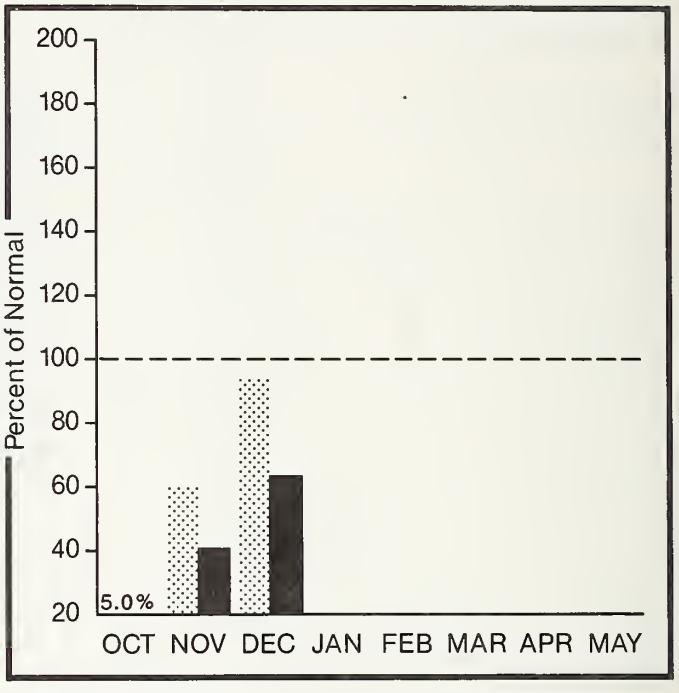
Maximum

Minimum

Average

Current

Precipitation* (percent of normal)



*Based on selected stations

Monthly precipitation

Year to date precipitation

COWLITZ - LEWIS RIVER BASINS

WATER SUPPLY OUTLOOK:

January 1 snow cover for the Cowlitz-Lewis Basin is 72% of normal. The Paradise SNOTEL site had the maximum water content for the basin with a snowpack containing 18.8 inches of water on December 31. December precipitation was 93% of normal bringing the water year to date precipitation to 63% of average. Summer runoff forecasts for the Lewis River are 75% and for the Cowlitz River 76%. The Plains of Abraham SNOTEL site on Mt St. Helens will not be reporting the rest of the winter, it blew away.

For more information contact your local Soil Conservation Service office.

COWLITZ - LEWIS RIVER BASINS

STREAMFLOW FORECASTS

FORECAST POINT	FORECAST PERIOD	25 YR. AVG. (1000AF)	MOST PROBABLE (1000AF)	MOST PROBABLE (% AVG.)	REAS. MAX. (1000AF)	REAS. MAX. (% AVG.)	REAS. MIN. (1000AF)	REAS. MIN. (% AVG.)
LEWIS RIVER at Ariel 2	APR-SEP	1244.0	933.0	75	1455.0	117	410.0	33
	APR-JUL	1084.0	813.0	75	1270.0	117	355.0	33
	APR-JUN	958.0	719.0	75	1125.0	117	315.0	33
COWLITZ R. bl Mayfield Dam 2	APR-SEP	2036.0	1540.0	76	2460.0	121	620.0	30
	APR-JUL	1782.0	1350.0	76	2155.0	121	545.0	31
	APR-JUN	1524.0	1158.0	76	1845.0	121	470.0	31
COWLITZ R. at Castle Rock 2	APR-SEP	2687.0	2070.0	77	2745.0	102	1395.0	52
	APR-JUL	2343.0	1800.0	77	2390.0	102	1210.0	52
	APR-JUN	2015.0	1552.0	77	2060.0	102	1045.0	52

RESERVOIR STORAGE (1000AF)

RESERVOIR	USEABLE CAPACITY	** USEABLE STORAGE ** THIS YEAR	LAST YEAR	AVG.

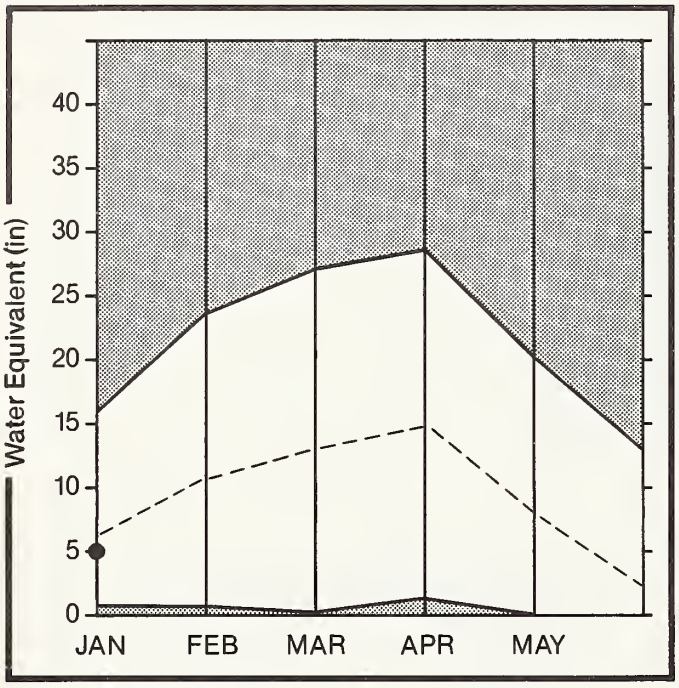
WATERSHED SNOWPACK ANALYSIS

WATERSHED	NO. COURSES AVG'D	THIS YEAR AS % OF LAST YR.	AVERAGE
Cowlitz River	1	121	83
Lewis River	2	138	113

1 - Reas. max. and reas. min. forecasts are for 5% and 95% exceedance levels and also (2) below.
2 - Corrected for upstream diversions or changes in reservoir storage.
The average is computed for the 1961-85 base period.

WHITE - GREEN

Mountain snowpack* (inches)



*Based on selected stations

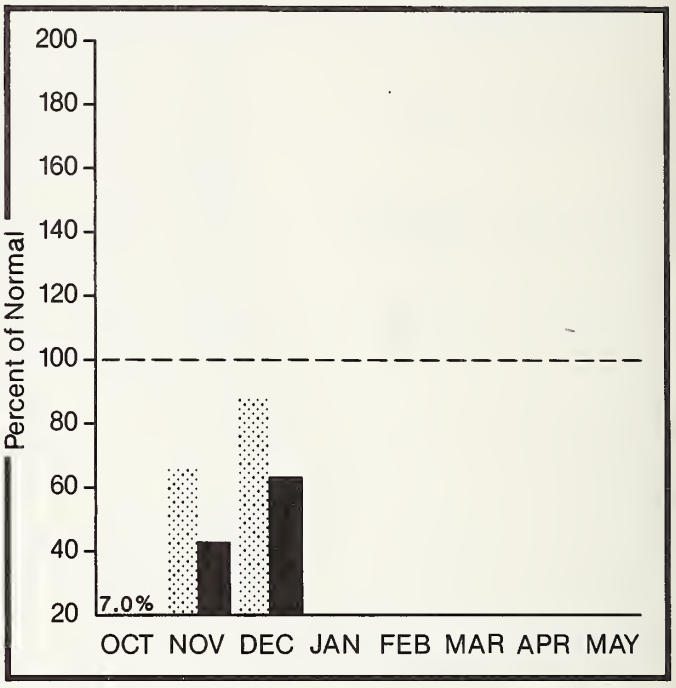
Maximum

Minimum

Average

Current

Precipitation* (percent of normal)



*Based on selected stations

Monthly precipitation

Year to date precipitation

WHITE - GREEN RIVER BASINS

WATER SUPPLY OUTLOOK:

Low flow conditions are expected to continue this summer for the west slope of the Cascade Mountains. Summer runoff is forecasted to be 74% and 71% of normal on the Green and Cedar Rivers. Snow water content at the Morse Lake SNOTEL site was 24.4 inches on January 1. December precipitation was 88% of normal, bringing the water year to date to 63% of average. Snowpack is 83% of normal for the basin.

For more information contact your local Soil Conservation Service office.

WHITE - GREEN RIVER BASINS

STREAMFLOW FORECASTS

FORECAST POINT	FORECAST PERIOD	25 YR. AVG. (1000AF)	MOST PROBABLE (1000AF)	MOST PROBABLE (% AVG.)	REAS. MAX. (1000AF)	REAS. MAX. (% AVG.)	REAS. MIN. (1000AF)	REAS. MIN. (% AVG.)
GREEN RIVER bl Howard Hanson Dam 2	APR-SEP	291.0	215.0	74	320.0	110	110.0	38
	APR-JUL	261.0	200.0	77	295.0	113	105.0	40
	APR-JUN	236.0	185.0	78	270.0	114	100.0	42
CEDAR RIVER nr Cedar Falls	APR-SEP	93.0	66.0	71	100.0	108	30.0	32

RESERVOIR STORAGE (1000AF)

RESERVOIR	USEABLE CAPACITY	** USEABLE STORAGE ** THIS YEAR	LAST YEAR	AVG.

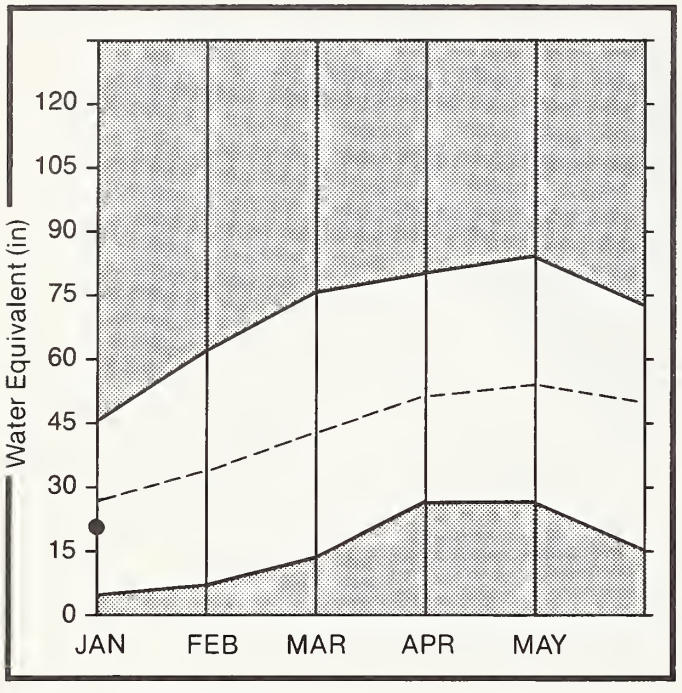
WATERSHED SNOWPACK ANALYSIS

WATERSHED	NO. COURSES AVG'D	THIS YEAR AS % OF LAST YR.	AVERAGE
White River	2	89	104
Green River	6	83	71

1 - Reas. max. and reas. min. forecasts are for 5% and 95% exceedance levels and also (2) below.
2 - Corrected for upstream diversions or changes in reservoir storage.
The average is computed for the 1961-85 base period.

NORTH PUGET SOUND

Mountain snowpack* (inches)



*Based on selected stations

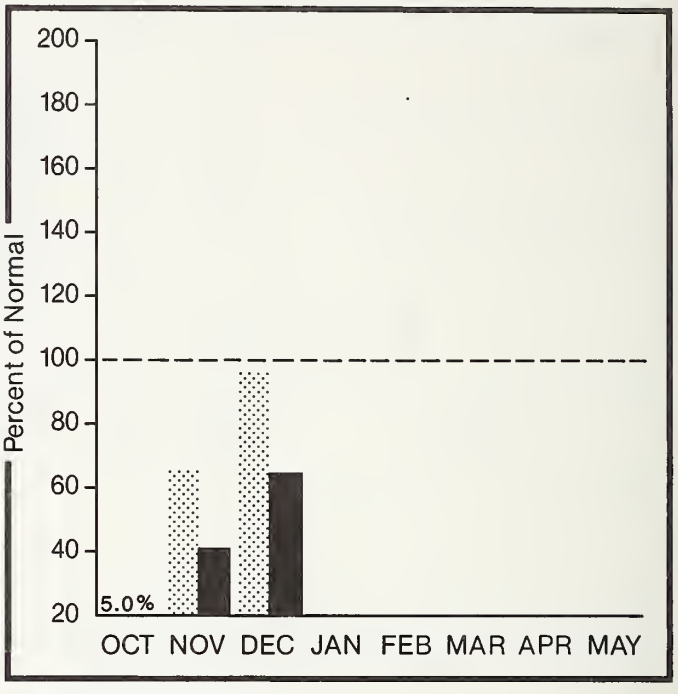
Maximum

Minimum

Average

Current

Precipitation* (percent of normal)



*Based on selected stations

Monthly precipitation

Year to date precipitation

NORTH PUGET SOUND RIVER BASINS

WATER SUPPLY OUTLOOK:

Streamflow on the Skagit River during December was 59% of average. Runoff for the Skagit River is forecasted to be 74% of normal. Reservoir storage is above average, with Ross Lake storing 916,100 acre feet as of January 1; 56% of capacity. Precipitation values for December were 95% of average with a water year to date at 65% of normal. Snow cover for January 1 in the North Puget Basin is 78% of normal, with Harts Pass SNOTEL at 6500 feet in elevation having 18.1 inches of water content.

For more information contact your local Soil Conservation Service office.

NORTH PUGET SOUND RIVER BASINS

STREAMFLOW FORECASTS

FORECAST POINT	FORECAST PERIOD	25 YR. AVG. (1000AF)	MOST PROBABLE (1000AF)	MOST PROBABLE (% AVG.)	REAS. MAX. (1000AF)	REAS. MAX. (% AVG.)	REAS. MIN. (1000AF)	REAS. MIN. (% AVG.)
SKAGIT RIVER at Newhalem 2	APR-SEP	2264.0	1698.0	75	2290.0	101	1105.0	49
	APR-JUL	1891.0	1418.0	75	1910.0	101	925.0	49
	APR-JUN	1442.0	1082.0	75	1460.0	101	705.0	49

RESERVOIR STORAGE (1000AF)

RESERVOIR	USEABLE CAPACITY	** USEABLE STORAGE ** THIS YEAR	LAST YEAR	AVG.
ROSS	1404.1	916.1	1178.7	783.9
DIABLO RESERVOIR	90.6	86.4	84.6	---
GORGE RESERVOIR	9.8	7.8	8.0	---

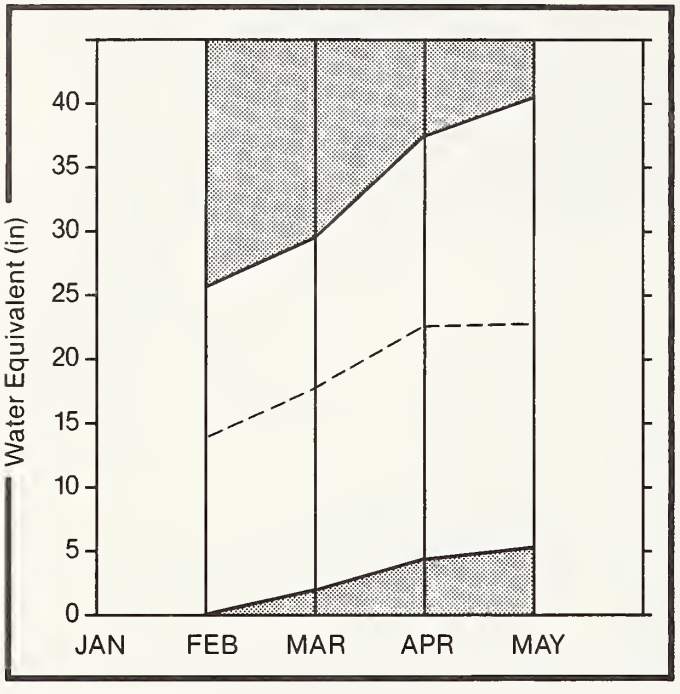
WATERSHED SNOWPACK ANALYSIS

WATERSHED	NO. COURSES AVG'D	THIS YEAR AS % OF LAST YR.	THIS YEAR AS % OF AVERAGE
Skagit River	2	94	78
Baker River	0	0	0
Cedar River	0	0	0
Snoqualmie River	0	0	0
Skykomish River	2	96	85

1 - Reas. max. and reas. min. forecasts are for 5% and 95% exceedance levels and also (2) below.
2 - Corrected for upstream diversions or changes in reservoir storage.
The average is computed for the 1961-85 base period.

OLYMPIC

Mountain snowpack* (inches)



*Based on selected stations

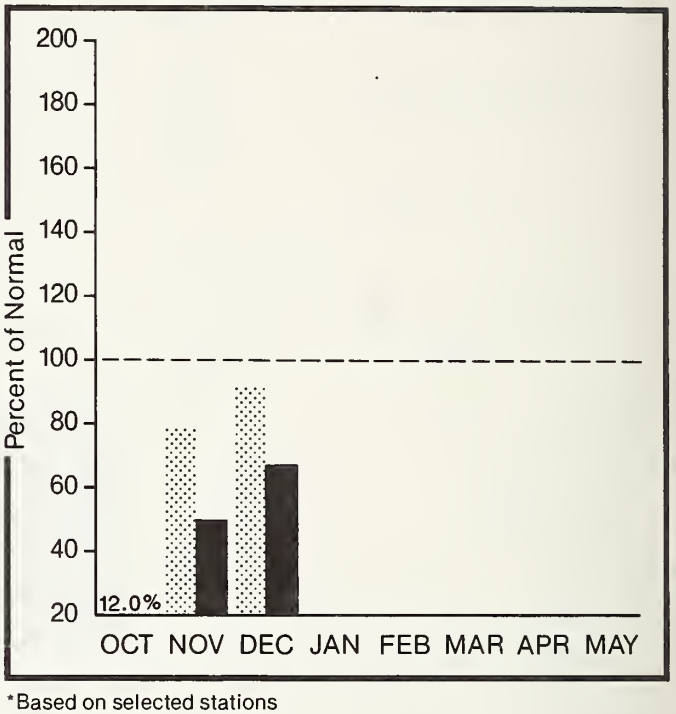
Maximum

Minimum

Average

Current

Precipitation* (percent of normal)



*Based on selected stations

Monthly precipitation

Year to date precipitation

OLYMPIC PENINSULA RIVER BASINS

WATER SUPPLY OUTLOOK:

The water year to date precipitation accumulation is 61% of normal. December precipitation was 91% of average. January 1 forecasts of runoff for streams in the basin are for 70% of average on the Dungeness River and the Elwha River. There were no snow courses measured this month. Because of low statewide snow measurements it is estimated that snow cover is below normal in the Olympic area.

For more information contact your local Soil Conservation Service office.

OLYMPIC PENINSULA RIVER BASINS

STREAMFLOW FORECASTS

FORECAST POINT	FORECAST PERIOD	25 YR. AVG. (1000AF)	MOST PROBABLE (1000AF)	MOST PROBABLE (% AVG.)	REAS. MAX. (1000AF)	REAS. MAX. (% AVG.)	REAS. MIN. (1000AF)	REAS. MIN. (% AVG.)
DUNGENESS RIVER nr Sequim	APR-SEP	159.0	110.0	69	145.0	91	75.0	47
	APR-JUL	129.0	89.0	69	115.0	89	60.0	47
	APR-JUN	97.0	67.0	69	90.0	93	45.0	46
ELWHA RIVER nr Port Angeles	APR-SEP	553.0	371.0	67	485.0	88	260.0	47
	APR-JUL	454.0	304.0	67	395.0	87	210.0	46

RESERVOIR STORAGE (1000AF)

RESERVOIR	USEABLE CAPACITY	** USEABLE STORAGE ** THIS YEAR	LAST YEAR	AVG.

WATERSHED SNOWPACK ANALYSIS

WATERSHED	NO. COURSES AVG'D	THIS YEAR AS % OF LAST YR.	AVERAGE
Dungeness River	0	0	0
Morse Creek	0	0	0
Elwha River	0	0	0

1 - Reas. max. and reas. min. forecasts are for 5% and 95% exceedance levels and also (2) below.
2 - Corrected for upstream diversions or changes in reservoir storage.
The average is computed for the 1961-85 base period.

DATA CURRENT AS OF: 1/ 6/88 13:58:30

BASIN SUMMARY OF SNOW COURSE DATA

JANUARY 1988

SNOW COURSE	ELEVATION	DATE	SNOW DEPTH	WATER CONTENT	LAST YEAR	AVERAGE 1961-85
PEND OREILLE RIVER						
BENTON MEADOW	2370	12/29/88	7	1.0	1.2	3.0
BENTON SPRING	4920	12/29/88	15	5.1	6.4	8.6
BUNCHGRASS MEADOWS	5000	1/01/88	---	8.0E	--	14.6
BUNCHGRASS MOWPILLOW	5000	1/01/88	---	7.9	--	16.2
HEART LAKE TRAIL	4800	12/31/88	28	5.0	6.7	9.2
HOOOOO BASIN	6050	12/31/88	49	13.0	17.8	21.5
HOOOOO CREEK	5900	12/31/88	40	9.8	14.6	19.1
LOOKOUT	5140	1/04/88	28	7.4	13.6	14.5
NELSON CAN.	3100	12/31/88	19	3.5	8.3	7.2
SCHWEITZER BOWL	4800	12/31/88	34	9.9	10.4	13.8
SCHWEITZER RIDGE	6200	12/31/88	48	15.7	17.9	21.3
COLVILLE RIVER						
KETTLE RIVER						
BIG WHITE MTN CAN.	5510	12/30/88	29	8.0	5.9	7.2
FARRON CAN.	4000	12/30/88	17	3.8	3.5	9.9
OMAK LAKE, TWIN LAKES						
19A11 IS NOT ON FILE						
SPOKANE RIVER						
ABOVE BURKE	4100	1/04/88	14	3.2	8.0	8.4
FOURTH OF JULY SUM	3200	1/04/88	12	.3	.0	3.7
LOOKOUT	5140	1/04/88	28	7.4	13.6	14.5
LOST LAKE	6110	12/28/88	41	11.1	20.2	25.2
MOSQUITO RIDGE	5200	1/01/88	---	9.9E	12.5	17.1
SHERWIN	3200	12/30/88	12	2.5	3.7	5.6
SUNSET	5540	1/01/88	---	5.3E	12.1	14.7
NEWMAN LAKE						
QUARTZ PEAK PILLOW	4700	1/01/88	---	6.0	--	--
RAGGED RIDGE	3330	1/01/88	14	2.8	2.6	--
OKANOGAN RIVER						
BLACKWALL PEAK CAN.	6370	1/05/88	42	12.9	17.2	14.8
BRENDA MINE CAN.	4800	12/29/88	20	4.3	5.2	6.5
BROOKMERE CAN.	3200	12/28/88	18	3.7	5.7	4.6
ENDERBY CAN.	6200	12/30/88	61	18.7	18.4	18.6
GREYBACK RES CAN.	5120	12/30/88	13	2.3	3.0	3.1
HAMILTON HILL CAN.	4890	12/30/88	24	3.4	5.4	8.4
HARTS PASS PILLOW	6500	1/01/88	---	18.1	19.1	27.2
ISINTOK LAKE CAN.	5500	12/28/88	9	1.6	2.4	3.5
LOST HORSE MTN CAN.	6300	12/30/88	14	2.1	3.8	4.7
MCCULLOCH CAN.	4200	12/30/88	13	2.8	2.3	3.2
MISSION CREEK CAN.	5800	12/30/88	28	7.0	6.5	8.9
MT. KOBAU CAN.	5900	12/28/88	28	7.8	2.8	6.3
19A11 IS NOT ON FILE						
2G02 C IS NOT ON FILE						
SALMON MOWS PILLOW	4500	1/01/88	---	5.4S	2.3	7.0
SILVER STAR MTN CAN.	6000	1/01/88	42	12.6	10.5	13.4
SUMMERLAND RES CAN.	4200	12/26/88	12	2.0	3.3	4.5
VASEUX CREEK CAN.	4600	12/29/88	10	1.9	1.4	2.7
WHITE ROCKS MTN CAN.	6000	12/30/88	34	10.7	9.3	11.6
METHOW RIVER						
HARTS PASS PILLOW	6500	1/01/88	---	18.1	19.1	27.2
19A11 IS NOT ON FILE						
SALMON MOWS PILLOW	4500	1/01/88	---	5.4S	2.3	7.0
CHELAN LAKE BASIN						
LYMAN LAKE PILLOW	5900	1/01/88	---	25.1	27.1	28.3
MIRROR LAKE PILLOW	5600	1/01/88	---	18.5	17.4	14.1
PARK CK RIDGE PILLOW	4600	1/01/88	---	22.8	24.4	20.6
ENTIAT RIVER						
WENATCHEE RIVER						
BERNE-MILL CREEK	3170	12/30/88	42	12.2	10.4	11.7
BLEWETT PASS#2PILLOW	4270	1/01/88	---	8.8	5.9	11.5
CHIWAUKUM G.S.	2500	12/31/88	28	5.1	3.4	5.0
LYMAN LAKE PILLOW	5900	1/01/88	---	25.1	27.1	28.3
MERRITT	2140	12/31/88	30	7.0	4.3	7.5
STEVENS PASS PILLOW	4070	1/01/88	---	17.2S	20.0	18.9
STEVENS PASS SANO SO	3700	12/30/88	48	15.2	13.9	19.3
COLOCKUM CREEK						
TROUGH #2 PILLOW	5310	1/01/88	---	5.8S	3.5	5.1
SQUILCHUCK CREEK						
STEMILT CREEK						
YAKIMA RIVER						
AHTANUM R.S.	3100	12/21/88	14	3.3	2.6	3.6
BIG BOULDER CREEK	3200	12/30/88	34	7.8	6.6	7.2
BLEWETT PASS#2PILLOW	4270	1/01/88	---	8.8	5.9	11.5
BUMPING LAKE	3450	12/30/88	28	7.3	3.8	6.5
BUMPING LAKE (NEW)	3400	12/30/88	32	8.7	4.8	8.0
CORRAL PASS PILLOW	6000	1/01/88	---	14.5	22.5	15.5
20B04 IS NOT ON FILE						
FISH LAKE PILLOW	3370	1/01/88	---	11.6	12.9	15.1
GREEN LAKE PILLOW	6000	1/01/88	---	11.8	5.0	8.7
GROUSE CAMP PILLOW	5380	1/01/88	---	9.9	4.5	9.0
LAKE CLE ELUM	2200	12/30/88	16	3.0	--	4.2
MORSE LAKE PILLOW	5400	1/01/88	---	24.4	21.1	22.0
SASSE RIDGE PILLOW	4200	1/01/88	---	13.1S	11.9	15.4
TUNNEL AVENUE	2450	12/28/88	25	6.5	--	8.7
WHITE PASS E.S.	4500	12/31/88	29	6.0	4.6	9.7
WHITE PASS ES PILLOW	4500	1/01/88	---	8.6S	7.1	10.4
AHTANUM CREEK						
AHTANUM R.S.	3100	12/21/88	14	3.3	2.6	3.6
GREEN LAKE PILLOW	6000	1/01/88	---	11.8	5.0	8.7
MILL CREEK						
HIGH RIDGE PILLOW	4980	1/01/88	---	3.7S	10.3	12.2
LEWIS AND COWLITZ RIVERS						
JUNE LAKE PILLOW	3200	1/01/88	---	11.1	11.6	11.6
LONE PINE PILLOW	3800	1/01/88	---	9.9	12.1	16.9
POTATO HILL PILLOW	4500	1/01/88	---	10.3	8.8	12.6
SHEEP CANYON PILLOW	4050	1/01/88	---	12.2S	9.3	18.1
STRAWBERRY L. PILLOW	3280	1/01/88	---	19.6S	17.3	21.7
WHITE PASS E.S.	4500	12/31/88	29	6.0	4.6	9.7
WHITE PASS ES PILLOW	4500	1/01/88	---	8.6S	7.1	10.4
WHITE RIVER						
CORRAL PASS PILLOW	6000	1/01/88	---	14.5	22.5	15.5
MORSE LAKE PILLOW	5400	1/01/88	---	24.4	21.1	22.0
GREEN RIVER						
COUGAR MTN. PILLOW	3200	1/01/88	---	6.8	7.0	11.2
GRASS MOUNTAIN #2	2900	1/02/88	9	1.3	3.8	5.4
LESTER CREEK	3100	1/02/88	28	7.1	4.5	8.6
LYNN LAKE	4000	1/02/88	25	6.0	7.0	7.8
SAWMILL RIDGE	4700	1/02/88	36	10.6	14.9	14.1
TWIN CAMP	4100	1/02/88	29	8.7	11.4	10.3
CEDAR RIVER						
SNOQUALMIE RIVER						
SKYKOMISH RIVER						
STEVENS PASS PILLOW	4070	1/01/88	---	17.2S	20.0	18.9
STEVENS PASS SANO SO	3700	12/30/88	48	15.2	13.9	19.3
SKAGIT RIVER						
HARTS PASS PILLOW	6500	1/01/88	---	18.1	19.1	27.2
LYMAN LAKE PILLOW	5900	1/01/88	---	25.1	27.1	28.3
BAKER RIVER						
DUNGENESS RIVER						
NORSE CREEK						
ELWHA RIVER						

CONSERVE YOUR IRRIGATION WATER

Can irrigators use less water and get good yields? We think so. With energy costs on an upward spiral and water shortages likely, we offer these water saving ideas to irrigators.

Consider ditch lining or gated pipe. This will reduce the 10-90% loss which occurs in earth ditches.

Keep ditches clean and free from weeds, sediment or other debris, which can slow water velocity, affect delivery rate, and increase evaporation.

Make sure head gates, drop structures, and pipe inlets are operational. A washed out structure is water lost.

Inspect ditch banks for rodent damage. Rodent holes cause leakage or failures.

Make sure sprinkler nozzles are not worn or leaky. Check pipe connections nd valves to prevent leaks.

Operate sprinklers at recommended pressure to effectively use available water.

Maintain your pump at peak efficiency to save energy.

BETTER WATER MANAGEMENT

Better water management may require more labor. It may require changing a head of water in the middle of the night. But it will be worth it. You should:

Measure your water to determine how much is applied.

Consider alternate row irrigation for crops planted in furrows.

Plan short runs. Match stream size and velocity to soil intake rate and capacity.

Catch and reuse tail water where possible.

Under irrigate the lower end of the field to stretch your water.

When water is short, consider eliminating that last irrigation.

Soil Conservation Service personnel can:

Help plan and design new irrigation systems or evaluate existing ones. Provide technical assistance for land leveling, pipeline installation, and other practices.

KNOW YOUR SOILS

Soil absorbs irrigation water at a given rate. This varies with each soil type. Some crops require more water than others. Check soil moisture by spade, probe, or moisture meter. Or use the "feel" method.

WHEN IRRIGATION IS NEEDED SOIL WILL FEEL AND ACT THIS WAY

Soil Texture	A handful of soil will
Coarse	Tend to stick together slightly, but will not form a ball
Medium	Be crumbly, but will form a ball
Fine	be pliable, and will form a ball.

If you have a conservation plan on your farm, or if the soil is your area has been mapped, the Soil Conservation Service can crosscheck soil type and irrigation data and provide you with the water holding capacity of your soil for a given crop.

The Following Organizations Cooperate With The Soil Conservation Service In Snow Survey Work

Canada:

Ministry of the Environment, Water
Investigations Branch, Victoria, British Columbia

States:

Washington State Department of Ecology
Washington State Department of Natural Resources

Federal:

Department of the Army
  Corps of Engineers
U.S. Department of Agriculture
  Forest Service
U.S. Department of Commerce
  NOAA, National Weather Service
U.S. Department of the Interior
  Bonneville Power Administration
  Bureau of Reclamation
  Geological Survey
  National Park Service
  Bureau of Indian Affairs

Local:

City of Tacoma
City of Seattle
Chelan County P.U.D.
Pacific Power and Light Company
Puget Sound Power and Light Company
Washington Water Power Company
Snohomish County P.U.D.
Colville Confederated Tribes

Private:

Okanogan Irrigation District
Wenatchee Heights Irrigation District
Newman Lake Homeowners Association

Other organizations and individuals furnish valuable information for snow survey reports. Their cooperation is gratefully acknowledged.

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SOIL CONSERVATION SERVICE
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